CLAIMS

1. Machine tool, especially a lathe, comprising

a machine frame upon which a first spindle housing carrier and a second spindle housing carrier are disposed in such a way that they can be moved in a Z direction in relation to each other,

a first working spindle, which receives a first workpiece and is mounted rotatably about a spindle axis in a spindle housing seated on the first spindle housing carrier,

a second working spindle, which is disposed coaxially with respect to the first working spindle, receives a second workpiece and is mounted rotatably about a spindle axis in a spindle housing seated on the second spindle housing carrier,

a first tool carrier, which is movable in an X direction and is associated with the first working spindle for the machining of the first workpiece, disposed in the latter,

a second tool carrier, which is movable in an X direction and is associated with the second working spindle for the machining of the second workpiece, disposed in the latter,

the first and second tool carriers being disposed on the same side of the spindle axis,

and a machine control unit for controlling the relative movements between the first workpiece and the tools of the first tool carrier and the second workpiece and the tools of the second tool carrier, wherein the spindle housing carriers extending laterally away from the spindle housings and a third tool carrier, movable at least in an X direction and associated with one of the working spindles, being provided between the spindle housing carriers of the first and second working spindles on a side of the spindle axes which is approximately opposite from the first and second tool carriers.

2. Machine tool according to claim 1, wherein the third tool carrier is disposed on an X slide, which is guided on an X slide base by X guides disposed in an X guiding plane perpendicular to the spindle axes.

3. Machine tool according to claim 1, wherein a fourth tool carrier is disposed between the first and second spindle housing carriers and the third tool carrier is associated with the first working spindle and the fourth tool carrier is associated with the second working spindle.

4. Machine tool according to claim 3, wherein the fourth tool carrier is disposed on an X slide which is guided on an X slide base by X guides disposed in the X guiding plane perpendicular to the spindle axes.

5. Machine tool according to claim 3, wherein the third tool carrier and the fourth tool carrier are respectively seated on an X slide of their own.

6. Machine tool according to claim 5, wherein the X slide of the third tool carrier and the X slide of the fourth tool carrier are seated on a common X slide base.

7. Machine tool according to claim 5, wherein each of the X slides has an X slide base of its own.

8. Machine tool according to claim 1, wherein the X guides have in the transverse direction running in the X guiding plane and transversely to the X direction a spacing from each other which corresponds at least to an effective diameter of the workpiece receptacle in the respective working spindles.

9. Machine tool according to claim 1, wherein the X guides have in a transverse direction running in the X guiding plane and transversely to the X direction a spacing from each other which is of the order of magnitude of an extent of the respective tool carrier in the transverse direction.

10. Machine tool according to claim 1, wherein the X slide has a slide body which is guided by the X guides close to its edge sides that are spaced apart in the transverse direction.

11. Machine tool according to claim 1, wherein the slide body is guided by X guides seated on edge surfaces running transversely to the X guiding plane.

12. Machine tool according to claim 1, wherein the X slide base is formed as a Z slide guided by Z guides.

13. Machine tool according to claim 12, wherein the Z slide is guided by a Z guide on the spindle housing carrier which has its working spindle associated with the tool carrier disposed on the Z slide.

14. Machine tool according to claim 13, wherein the Z guide has an arm which extends from the Z slide in the direction of the spindle housing carrier guiding the latter.

15. Machine tool according to claim 14, wherein the arm extends beyond the spindle housing carrier.

16. Machine tool according to claim 14, wherein the arm extends through a Z guiding receptacle for said arm which is disposed on the spindle housing carrier.

17. Machine tool according to claim 1, wherein a Z axial drive is provided, with which the Z slide can be moved in relation to the respective spindle housing carrier.

18. Machine tool according to claim 17, wherein a Z axial drive is effective between the arm and the spindle housing carrier guiding the latter.

19. Machine tool according to claim 18, wherein a drive motor for the Z axial drive is held by the arm.

20. Machine tool according to claim 14, wherein an X axial drive motor for the X slide is disposed at an end of the arm opposite from the Z slide.

21. Machine tool according to claim 20, wherein a drive train extends along the arm between the X axial drive motor and the Z slide.

22. Machine tool according to claim 21, wherein the drive train is led through the arm.

23. Machine tool according to claim 1, wherein the Z slide is supported by at least one guiding element on a Z guide provided on the machine frame.

24. Machine tool according to claim 23, wherein the Z slide is guided by a guiding element respectively on one of two Z guides disposed on the machine frame.

25. Machine tool according to claim 23, wherein at least one of the guiding elements is guided on the corresponding Z guide with a guiding length in the Z direction which is less than a guiding length accepting tilting moments of the Z slide.

26. Machine tool according to claim 23, wherein at least one of the guiding elements is guided on the corresponding Z guide in such a way that the latter only accept forces lying in a plane running transversely to the Z direction.

27. Machine tool according to claim 12, wherein the Z guides disposed on the machine frame are also formed as Z guides of a further slide guided on the machine frame.

28. Machine tool according to claim 1, wherein at least one of the spindle housing carriers forms a spindle housing carrier slide which can be made to move in the Z direction for the working spindle carried by said slide.

29. Machine tool according to claim 28, wherein both spindle housing carriers are formed as spindle housing carrier slides which can be made to move in the Z direction.

30. Machine tool according to claim 28, wherein a Z guiding plane, in which the Z guides for the spindle housing carrier slide lie, runs transversely to a setting-up area of the machine frame.

31. Machine tool according to claim 28, wherein the Z slide is guided at least on one of the two spaced-apart Z guides for the respective spindle housing carrier slide.

32. Machine tool according to claim 31, wherein the Z slide is guided on both spaced-apart Z guides for the respective spindle housing carrier slide.

33. Machine tool according to claim 1, wherein with the machine control unit in a machining mode, the third tool carrier can be made to move in relation to the first working spindle and the fourth tool carrier can be made to move in relation to the second working spindle into the Z positions required for the machining of the first workpiece and second workpiece, respectively.

34. Machine tool according to claim 33, wherein with the machine control unit in the machining mode, the first tool carrier and the first working spindle can be made to move in relation to each other into the Z positions required for the machining of the first workpiece.

35. Machine tool according to claim 33, wherein with the machine control unit in the machining mode, the second tool carrier and the second working spindle can be made to move in relation to each other into the Z positions required for the machining on the second workpiece.

36. Machine tool according to claim 1, wherein the third tool carrier carries tools which can be used at least on one of the workpieces, with the machine control unit in a machining mode, one of the working spindles being movable in relation to the third tool carrier in a way corresponding to the Z positions required for the machining of the respective workpiece by means of the tool provided on the third tool carrier for this workpiece, and the tool carrier associated with this working spindle being movable in relation to this working spindle in a way corresponding to the Z positions required for the machining of this workpiece by means of a tool provided on this tool carrier, likewise associated with the working spindle.

37. Machine tool according to claim 1, wherein with the machine control unit in the machining mode, the first working spindle is movable in relation to the third tool carrier and the second working spindle is movable in relation to the fourth tool carrier into the Z positions required for the machining of the first workpiece and second workpiece, respectively.

38. Machine tool according to claim 36, wherein the first tool carrier is movable in relation to the first working spindle and the second tool carrier is movable in relation to the second working spindle into the Z positions required for the machining.